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Indian Standard
SPECIFICATION FOR UNIVERSAL SAND TESTING MACHINES

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March 1985

Indian Standard
SPECIFICATION FOR UNIVERSAL SAND TESTING MACHINES

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Indian Standard

SPECIFICATION FOR UNIVERSAL SAND TESTING MACHINES

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 31 May 1984, after the draft finalized by the Foundry Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 Strength of foundry sand mixtures may be determined by the compressive, shear, tensile, transverse and deformation tests. The basic instrument on which the strength tests are carried may be of two types :

a) Hydraulic type, and

b) Pendulum type.

0.3 Since the strength of moulding sand and core sand greatly depends on how the sample is tested, it was felt necessary to formulate this standard for rationalizing the parameters of the testing machine so that uniform and comparable test results may be obtained.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard covers requirements for sand strength testing machines used for testing the strength of the moulding sands and core sands.

1.2 Typical universal strength testing machines have been illustrated in Fig. 1 and 2.

2. TEST SPECIMEN

2.1 Test specimen for the different strength tests may be prepared in accordance with IS : 1918-1966† on the standard sand rammer conforming to IS : 10487-1983‡, with the respective accessories.

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*Rules for rounding off numerical values (*revised*).

†Methods of physical tests for foundry sands.

‡Specification for sand rammer.

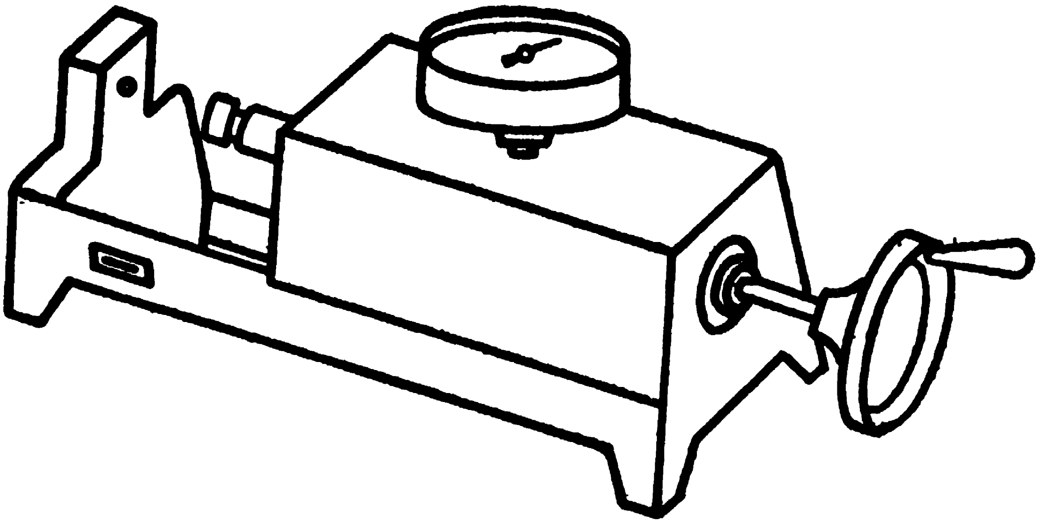

FIG. 1 HYDRAULIC TYPE

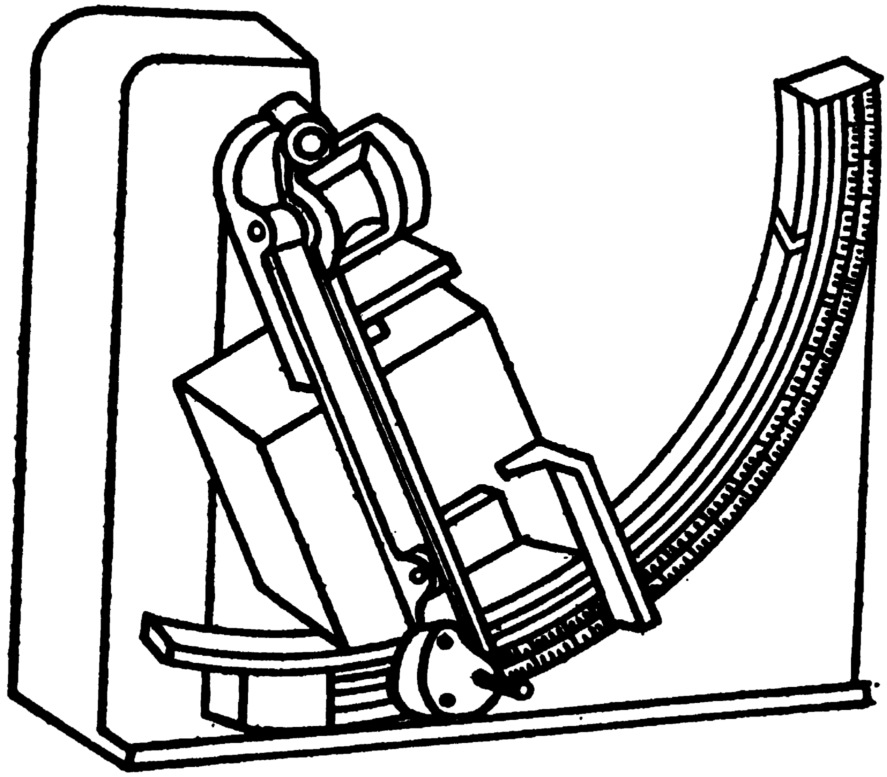

FIG. 2 PENDULUM TYPE

AMENDMENT NO.1 JUNE 1986

TO

IS:11099-1984 SPECIFICATION FOR UNIVERSAL SAND TESTING MACHINES

(*Page 5, clause 3.1.1, line 7*) - Substitute the word 'manufacturer' *for* 'manufacture' under the heading Grade and Specification.

(*Page 5, clause 3.1.2, line 6*) - Delete the word 'per' under the heading Grade and Specification.

(*Page 6, clause 4.1.4, line 2*) - Substitute the word 'for' *for* 'or'.

(*Page 6, clause 4.2.3, line 3*) - Substitute the word 'periphery' *for* 'perifery'.

(*Page 6, clause 4.2.4, lines 2 and 3*) - Delete the words (18.7 PSI), (14.7 PSI), (93.5 PSI), (73.5 PSI).

(SMDC 17)

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3. MATERIAL

3.1 Material used for the manufacture of universal sand testing machines specified in this standard shall comply with the following requirements:

3.1.1 *Material for Hydraulic Loaded Type Machine*

Material	*Grade and Specification*
Grey iron casting	Grade FG 200 of IS : 210-1978[*]
Medium carbon steel	Class 3A of IS : 1875-1978[†]
Mild steel	Fe 410 of IS : 226-1975[‡]
Brass Aluminium Pressure gauges	As mutually agreed by the manufacture and the purchaser

3.1.2 *Material for Pendulum Type Machine*

Material	*Grade and Specification*
Grey iron casting	Grade FG 200 of IS : 210-1978[*]
Medium carbon steel	Class 3A of IS : 1875-1978[†]
Mild steel	Fe 410 of IS : 226-1975[‡]
Bearing Magnet	As per mutually agreed by the manufacturer and the purchaser

4. CONSTRUCTIONAL REQUIREMENT

4.1 Hydraulic Type-Machine

4.1.1 *Frame* — The frame shall be of graded grey iron casting. The construction of the frame shall be rigid and shall accommodate the hydraulic unit at right hand side. At the left hand side it shall have a bracket to accommodate various attachment inserts.

4.1.2 *Hydraulic Unit* — Hydraulic unit shall be of honned mild steel tube with matching pistons of medium carbon steel, duly hardened. At one end, pressure piston connected to spindle with the hand wheel be turned to develop hydraulic pressure on the main piston which shall be inserted at the other end. The system shall be leak proof and the movement of the piston shall be linear. The main piston shall have a suitable cover and provision to accommodate various attachments. The hydraulic cylinder shall have the provision for filling the oil and fixing the pressure gauge.

---

[*] Specification for grey iron castings (*third revision*).

[†] Specification for carbon steel billets, blooms, slabs and bars for forgings (*fourth revision*).

[‡] Specification for structural steel (standard quality) (*fifth revision*).

4.1.3 *Pressure Gauge* — Suitable pressure gauges shall be provided to this machine; for low pressure range, that is up to 15 Pa (15 N/cm^2), and another of high pressure range, that is, up to 130 Pa (130 N/cm^2) so as to read compression strength of the standard sand specimen. It shall also have calibrated scale to read tensile, transverse and shear strength of standard sand specimen. Gauges shall have the idle pointer to read the maximum breaking strength achieved.

4.1.4 The system shall be enclosed in the dust proof cover (keeping the hand when main piston and left hand bracket is to be opened or carrying out the tests).

4.1.5 The gap between left hand bracket with compression pad and main piston in 'off' load position with compression pad shall be sufficient to accommodate the sample but should not be less than 51 mm.

4.2 Pendulum Type Machine

4.2.1 *Frame* — The frame shall be of graded grey iron casting. The construction of the frame shall be rigid and in such a way that the left hand side is hollow and perpendicular to the base, to accommodate pendulum. The shape of the right hand side of the casting shall be quadrant. The frame shall have suitable provision to fix the scale.

4.2.2 *Pendulum* — The pendulum shall be of graded grey iron casting of a definite shape having extensions to accommodate various accessories. Pendulum weight shall be calibrated to match the scale readings. The lower extension shall be fitted with bent sheet metal piece, to push the magnet throughout the scale, during the movement of the pendulum, while loading the specimen. The pendulum shall be suspended in the hollow part of the frame on a ball-bearing, supported by medium carbon steel rod, having extension in the front, to accommodate the movable arm.

4.2.3 *Movable Arm* — Movable arm shall be of graded grey iron casting. It shall have provision to accommodate the various accessory inserts. There shall be a facility to move the movable arm along with the perifery of the quadrant.

4.2.4 *Scale* — Scale shall have calibration for green compression at 12 Pa (18·7 PSI), green shear at 9·3 Pa (14·7 PSI), dry compression at 64 Pa (93·5 PSI), and dry shear at 50 Pa (73·5 PSI) strength. This shall be of mild steel sheet.

4.2.5 *Magnet* — Magnet shall be of rectangular shape.

5. LOADING RATE

5.1 Load shall be applied by rotating the wheel at the rate of 60 rev/min.

6. ACCESSORIES

6.1 Necessary calibration kit along with the procedure for calibration may be supplied, if required by the purchaser.

7. WORKMANSHIP AND FINISH

7.1 The workmanship and finish of each part of the equipment shall be of highest quality and shall be free from any harmful and surface defects.

7.2 All movable parts of the equipment shall be properly coated with the suitable rust prevented oil.

7.2.1 All fixed parts of the equipment shall also be suitably painted or coated to prevent rusting.

8. PACKING

8.1 Proper packing of the equipment and accessories shall be made to avoid any damage while in transit or otherwise as specified by the purchaser.

9. MARKING

9.1 Each equipment shall be marked clearly with the manufacturers name or trade-mark, serial number and manufacturing date.

9.2 BIS Certification Marking

The product may also be marked with Standard Mark.

9.2.1 The use of the Standard Mark is governed by the provisions of the Bureau of Indian Standards Act, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

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